

OLYMPUS Technology Strategy for ICT-AI Platform

**Development of an open platform for AI-assisted diagnosis in endoscopic examinations**

~To offer applications of Computer-Aided Diagnosis (CAD)  
in Gastrointestinal Endoscopy~

March 13<sup>th</sup>, 2019

Takaharu Yamada

General Manager

GI&R Endoscopy Marketing Department

### Endoscopy Intelligent System

Inspection Preparation

Cleaning and Disinfection

Insertion

Reporting

Therapy

Diagnosis

### OLYMPUS AI Server in Surgery

Advanced Imaging

Advanced Manipulation

Active Energy Control

Image Navigation

Voice Control

AR/VR

AI Based SI & Protocol Tracking

1-1 : ABCD  
2-1 : EFGH  
2-2 : OPQR  
3 : ...

### Intelligent Sensing for Inspection

Digital Imaging Sensing

Support for Human Inspection

Evidence-based Machine Inspection

Inspection Evidence and Effectiveness Data Analysis

Multi-modal Inspection Data Analysis

# Endoscopic Inspection Workflow



 ICT reduces stress/loads in preparation

## Inspection Preparation

## Endoscope Reprocessing

 ICT improves efficiency & quality in cleaning & disinfection

**Insertion**  
 AI supports insertion through navigation \*

## Reporting

  ICT realizes semi-automated reporting

**Diagnosis**  
 AI assists diagnosis by providing more information \*

 ICT supports efficient & effective treatment

## Therapy

\*Technology not yet approved under the Act on Pharmaceuticals and Medical Devices



# Endoscopic Inspection Workflow



**ICT** Reduced Inspection Preparation Requirements utilizing ICT Technology

## Inspection Preparation

## Cleaning and Disinfection

**ICT** High-Quality Cleaning and Disinfection Process Enabled with ICT Technology

## Insertion

**AI** Insertion Support Navigation Utilizing AI Technology

## Reporting

**AI** **ICT** Self Reporting Enabled with AI and ICT Technology

## Diagnosis

**AI** AI assists diagnosis by providing more information\*

**ICT** Efficient therapy with ICT technology

## Advanced Therapy

\*Technology not yet approved under the Act on Pharmaceuticals and Medical Devices

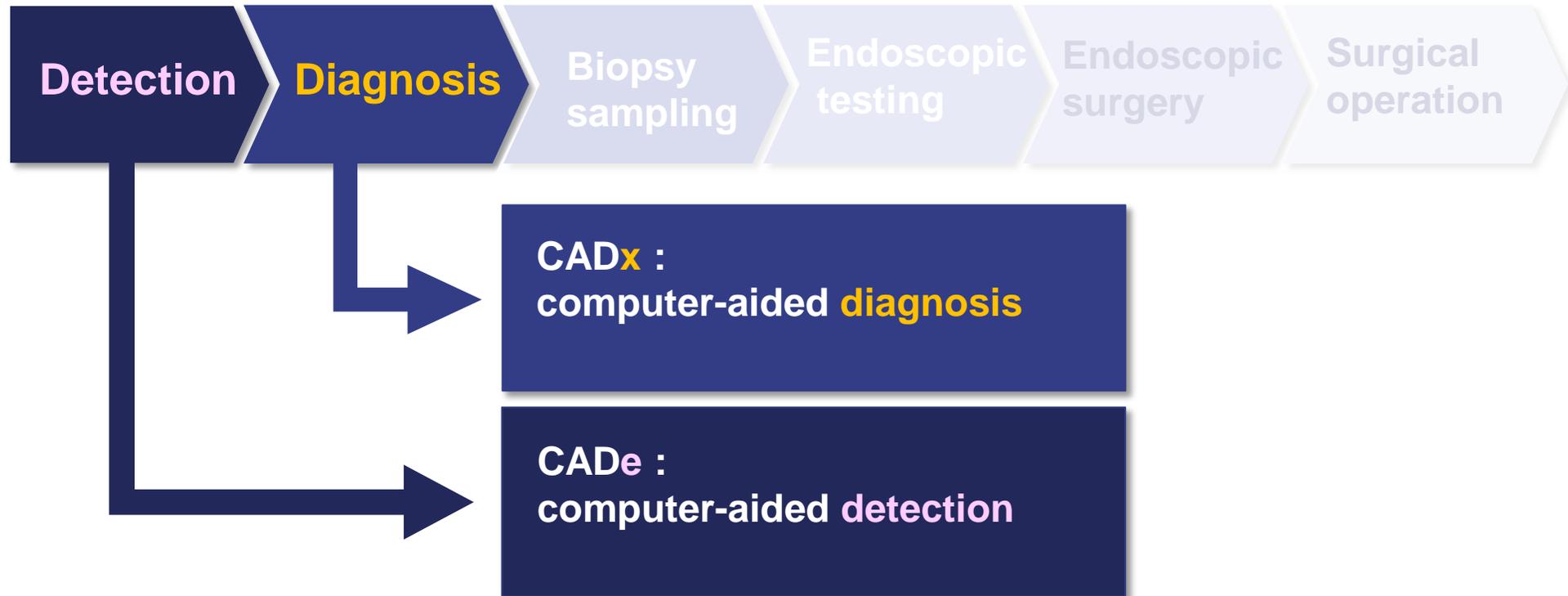
\*Technology not yet approved under the Act on Pharmaceuticals and Medical Devices

## CAD

Computer-Aided Diagnosis

Computers quantitatively analyze medical images and supports disease diagnosis (detection and differentiation) by doctors

➡ Doctors make final decisions.



\*Technology not yet approved under the Act on Pharmaceuticals and Medical Devices

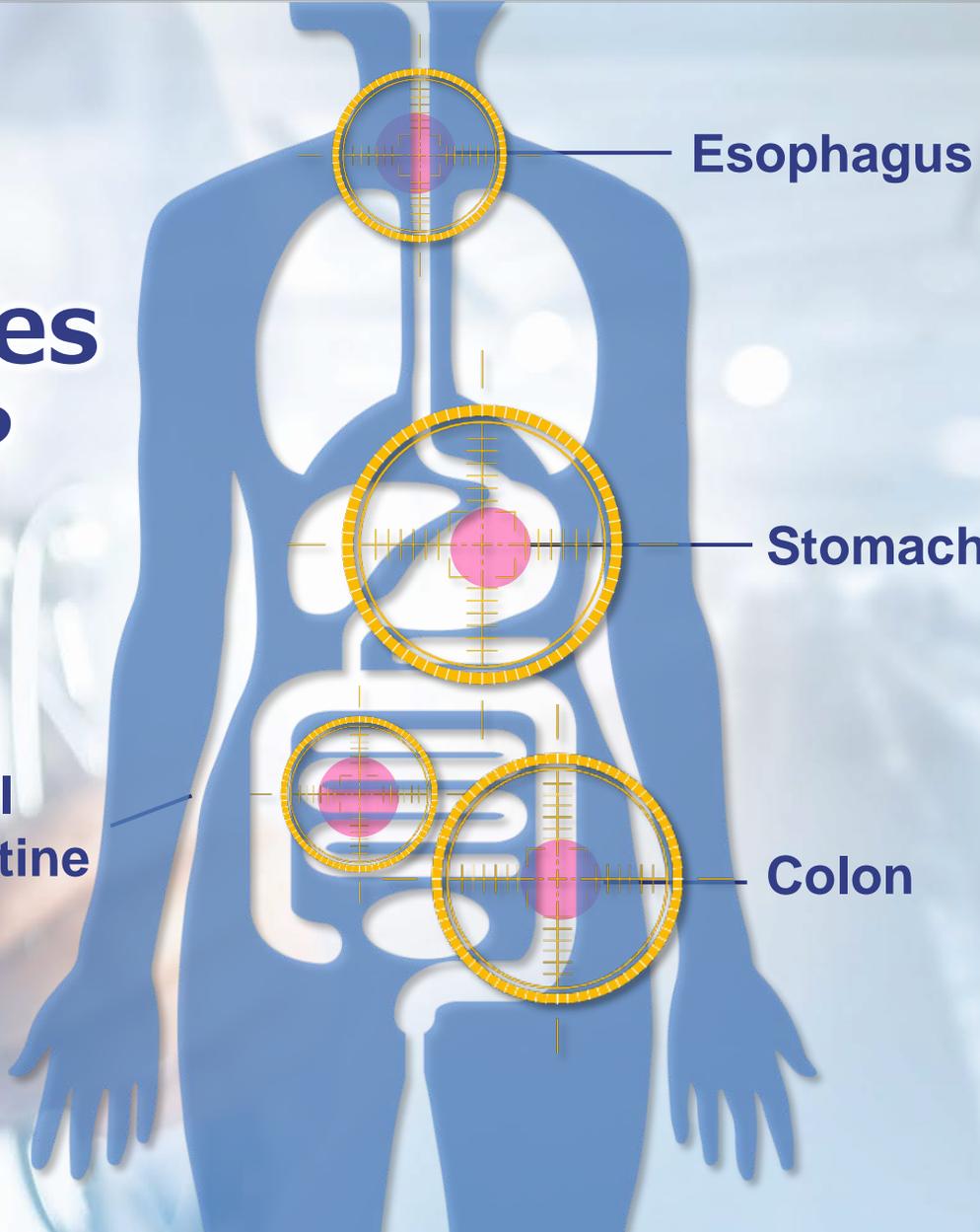
## Which diseases/organs does the technology apply to?

**Cancer**

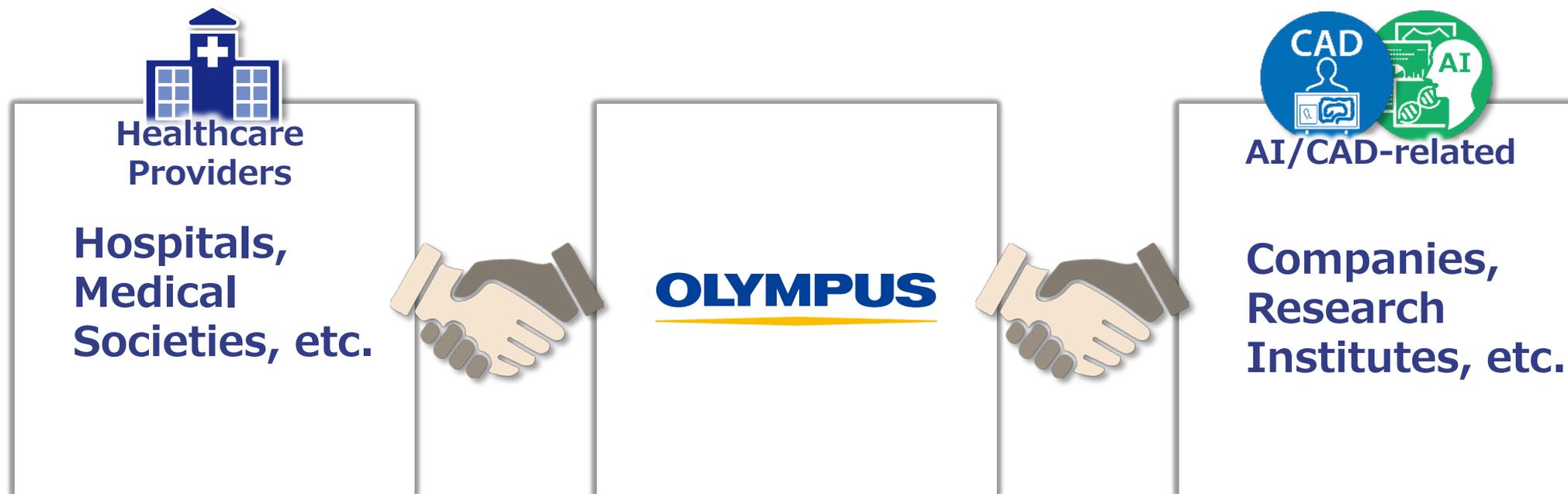
**Tumors**

**IBD**

etc...



We will continue working with healthcare professionals while also looking to collaborate with other organizations that offer strong AI technology to complement our own CAD development, aiming to realize a range of CAD applications technologies for the gastrointestinal endoscopy field

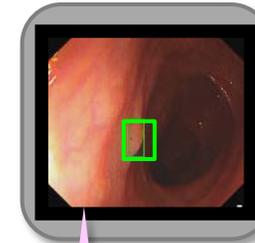


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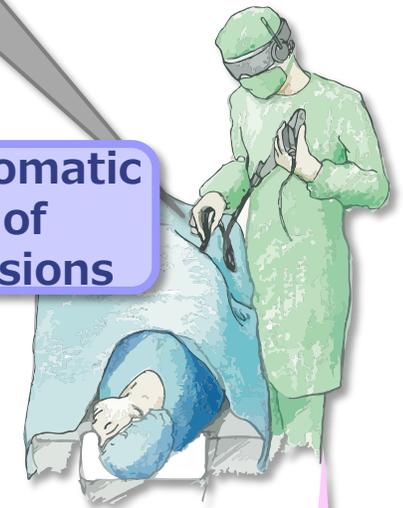
## Contribute to enhance the efficiency in endoscopic inspection

Clinical images are not allowed to be attached

Colonoscope



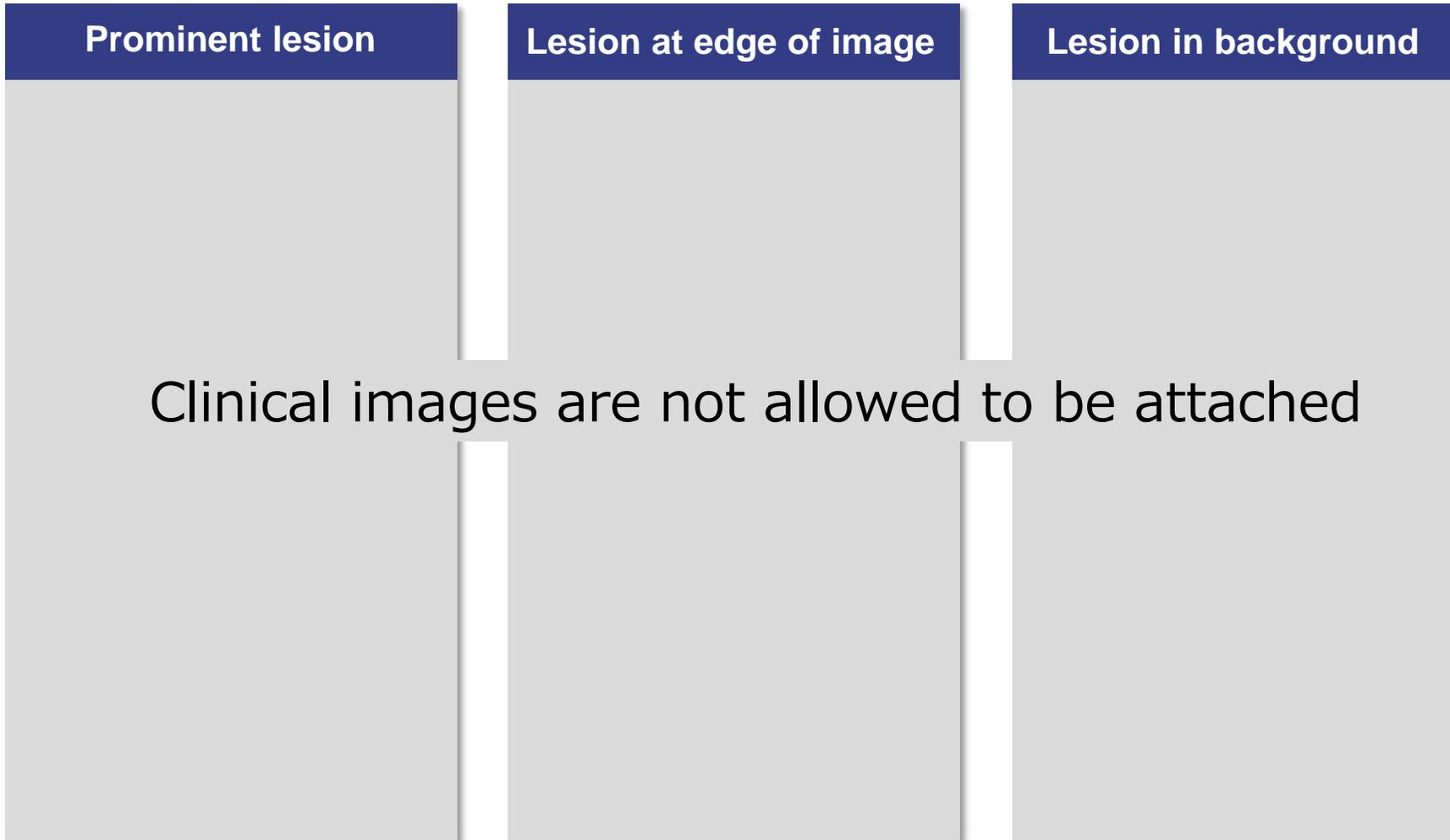
Real-time automatic detection of suspicious lesions



Support doctors in detecting diseases

\*Technology not yet approved under Act on Pharmaceuticals and Medical Devices

## Detecting lesions under various conditions based on training data from expert doctors



Clinical images are not allowed to be attached

\*Technology not yet approved under Act on Pharmaceuticals and Medical Devices

## Detecting lesions under various conditions based on training data from expert doctors



\*Technology not yet approved under Act on Pharmaceuticals and Medical Devices



ニュースリリース

2019年2月25日

## 大腸内視鏡検査における医師の診断補助に貢献 AIを搭載した内視鏡画像診断支援ソフトウェア「EndoBRAIN®」を発売 内視鏡分野のAI技術において国内初の薬事承認を取得

オリンパス株式会社(社長:笹 宏行)は、大腸の超拡大内視鏡画像を人工知能(AI)で解析し、医師の診断を補助する内視鏡画像診断支援ソフトウェア「EndoBRAIN®(エンドブレイン)」を2019年3月8日(金)から国内で発売します。本製品は内視鏡分野において国内で初めて薬事承認を取得したAI製品です。

本ソフトウェアは、昭和大学横浜市北部病院、名古屋大学大学院、サイバネットシステム株式会社により、AMED※1 支援のもと研究開発されました。臨床性能試験を経て、サイバネットシステム株式会社が2018年12月6日に医薬品医療機器等法の製造販売承認を取得し、当社は同社から国内における独占販売権を取得しました。

当社製の超拡大内視鏡 Endocyto※2 で撮影された大腸の超拡大内視鏡画像を AI が解析し、検査中にリアルタイムで「腫瘍性ポリープ」※3 または「非腫瘍性ポリープ」※4 の可能性を数値として出力し、高い診断精度※5 により、医師の診断をサポートします。

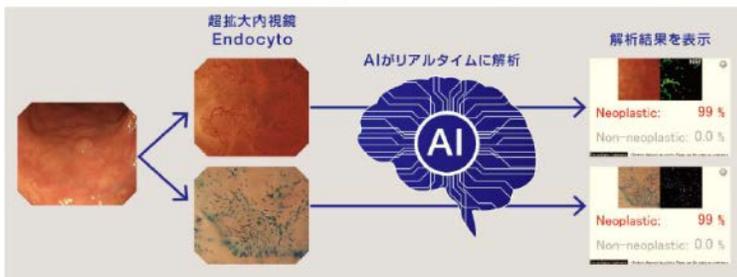
### ●主な特長の詳細

#### 1. 病変の腫瘍・非腫瘍の判別を自動で行い、リアルタイムでの診断支援を実現

超拡大内視鏡 Endocyto で撮影された大腸内視鏡画像を人工知能(AI)が解析し、診断結果(腫瘍または非腫瘍の可能性)を数値で表示します。約 60,000 枚の内視鏡画像を学習させたことで、国内多施設後向き性能評価試験では感度※196.9%、正診率※298.0%という専門医に匹敵する診断精度が得られました。診断結果はリアルタイムに表示されるため、検査中における医師の診断をサポートします。

※1 疾患のある患者のうち、検査で正しく陽性と診断された人の割合。

※2 疾患のある患者・疾患のない患者のうち、検査で正しくそれぞれ陽性・陰性と診断された人の割合。



News Release: Announced on Feb 25<sup>th</sup> for Japan

Launched EndoBRAIN®, AI-assisted diagnostic support software for endoscopic images, with an expectation as a diagnostic support tool for doctors in colonoscopies. Obtained the Japan's first regulatory approval as an AI technology in the endoscopy field



# 3:ICT-AI Technology Initiative



AI solutions for gastrointestinal cancer screening

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## OUR TEAM

ai4gi is a commercial initiative which leverages the expertise of highly experienced Learning as applied to the detection and treatment of gastro-intestinal cancer. This from Imagia Inc.

ai4gi enjoys the oversight and guidance of a seasoned advisory board chaired by Dr. fortunate enough to have Dr. Pradeep Bhandari, Dr. Helmut Neumann, and Dr. Coli



OUR LEADERSHIP

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Press Center

### NEWS CENTER

#### Olympus Announces Co-Development Agreement with ai4gi

Return to Press Center

CENTER VALLEY, Pa., (May 7, 2018) – Olympus, a global technology leader in designing and delivering innovative solutions for medical and surgical procedures, among other core businesses, announced today its co-development agreement with ai4gi, a commercial joint venture between Satis Operations and Imagia. Their Artificial Intelligence (AI) solution for real-time clinical decision support during screening and surveillance colonoscopy procedures will be exclusively offered by Olympus America Inc. (OAI). This co-development agreement is intended to raise the bar for all physicians to ultimately improve clinical outcomes, reduce overall costs and enhance quality of life for patients.

The integration of AI into the colonoscopy procedure holds great promise for the future of GI screening for physicians and patients. Ai4gi initially developed this clinical decision support tool using a large volume of unaltered endoscopic colonoscopy videos from global physician experts in combination with deep learning training models. By incorporating AI, Olympus is investing in technology that will elevate all clinicians while unlocking new ways to treat disease for patients. This is the first co-development agreement of its kind in the U.S. market and is the first time an AI proof-of-concept has been demonstrated clinically in real-time in a screening colonoscopy application.

Colon cancer continues to be a major health issue in the U.S. According to the American Cancer Society, approximately 140,000 Americans—men and women—are diagnosed with colon cancer every year, and over 50,000 die from the disease. While colorectal cancer (CRC) is the second leading cancer killer in the U.S. among men and women combined, it is the most detectable and treatable form if detected early. Olympus is the leading manufacturer of medical devices used to peer inside the human body to help medical practitioners detect, diagnose, and treat gastrointestinal diseases such as colon cancer.

"ai4gi's solutions to early colon cancer recognition are going to be a game-changer in the field of Gastroenterology" said Dr. Michael Byrne, CEO of Satis Operations and Clinical Lead at ai4gi. "These solutions are what the industry needs for more timely and more effective patient care, and Olympus is an ideal industry partner to drive clinical adoption of this technology. As doctors, we all need help to improve our practice, so why not use the best technology available?"

"We are thrilled to add Artificial Intelligence to our already powerful endoscopy portfolio which we feel is an emerging and essential core competency in this space," said Kurt Heine, Group Vice President of the Endoscopy Division at Olympus America Inc. "Our vision is to add Artificial Intelligence to our platform to improve the assessment of colon cancer screening as well as potentially other endoscopic procedures. Better visibility, along with increased efficiency, can bring us closer to our goal of improving quality of care, reducing healthcare costs and enhancing patient satisfaction."

"We are excited about the potential of our clinical AI solutions to promote paradigm shifts in the standard of care for endoscopic procedures," said Frédéric Francis, CEO of Imagia. "The clinical decision support from AI may benefit patients by enabling physicians to better predict polyp histology in real-time."

Olympus and ai4gi's collaboration will be highlighted at the largest annual Gastroenterology conference, Digestive Diseases Week (DDW), in Washington DC, June 2-5, 2018, booth #2833.

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**About Olympus Corporation of the Americas**

Olympus is a global technology leader, crafting innovative optical and digital solutions in medical technologies; life sciences; industrial solutions; and cameras and audio products. Our solutions enable specialists to look inside the human body, further scientific research, ensure public safety and capture images of the world. Throughout our nearly 100-year history, Olympus has focused on being true to society and making people's lives healthier, safer and more fulfilling.

Olympus Corporation of the Americas (OCA)—a wholly owned subsidiary of Olympus Corporation in Tokyo, Japan—is headquartered in Center Valley, Pennsylvania and employs more than 5,000 employees throughout locations in North and South America. For more information, visit [www.olympusamerica.com](http://www.olympusamerica.com).

**About ai4gi**

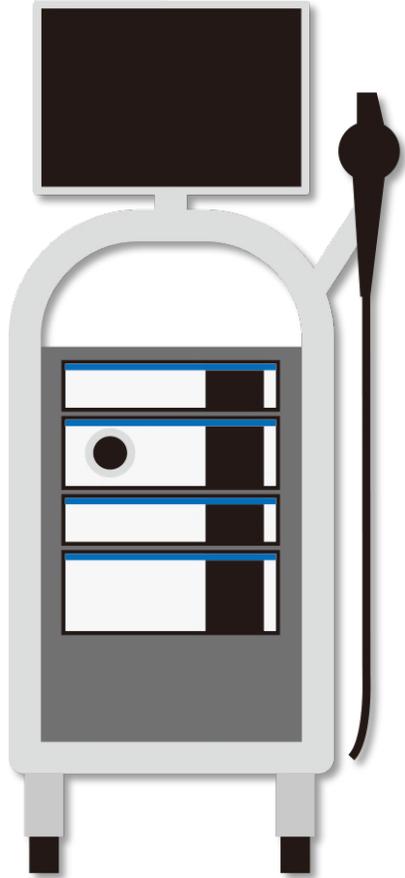
ai4gi is a commercial joint venture between Satis Operations and Imagia. Satis is a medical consultancy founded to deliver cutting-edge solutions in the field of Gastroenterology, by bringing quality data, clinical direction, market opportunity insight, academic awareness and visibility, and global GI key-opinion leadership to the Medtech and Biotech industries. Imagia is an AI healthcare company developing the Evidens collaboration ecosystem to unite creative minds in AI and healthcare to power discovery at scale. Through Evidens, clinical insights from member hospitals are united with AI expertise from Imagia and its AI research partners. We partner with pharmaceutical companies and medical device manufacturers to commercialize clinical AI solutions to improve personalized outcomes for patients. With an initial focus on personalized oncology, our mission is to leverage advances in AI to reveal the full picture of personalized healthcare.

For more information, visit [www.ai4gi.com](http://www.ai4gi.com) and [www.imagia.com](http://www.imagia.com)

May 7th, 2018  
News Release from Olympus America Inc. (OAI)

Executed a co-development agreement with ai4gi, a joint venture between Satis Operations and Imagia, specialized in AI solution for real-time clinical decision support in colonoscopy.

**Near future:  
Multiple CAD devices will be offered by various**



**Doctors require multiple CAD devices on hand**

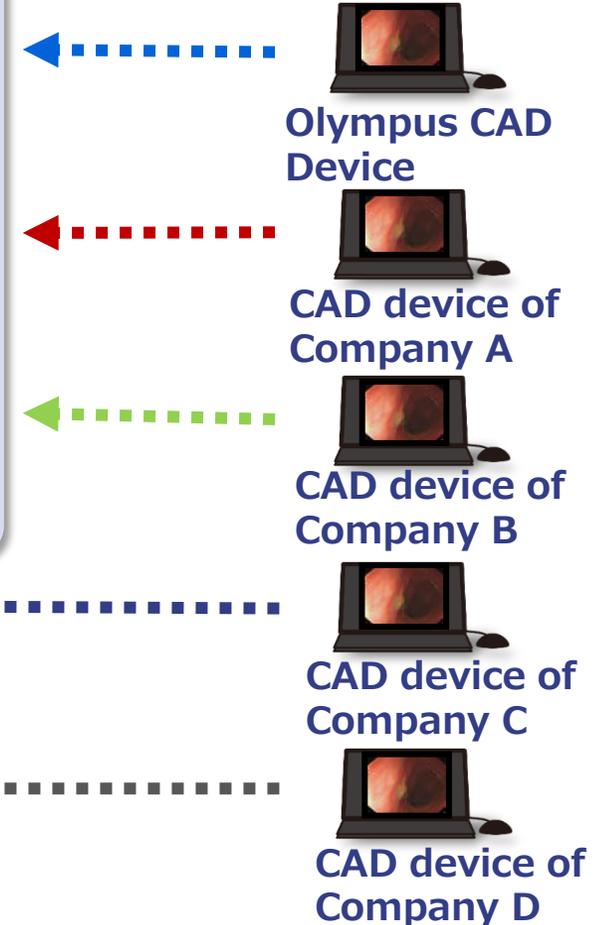


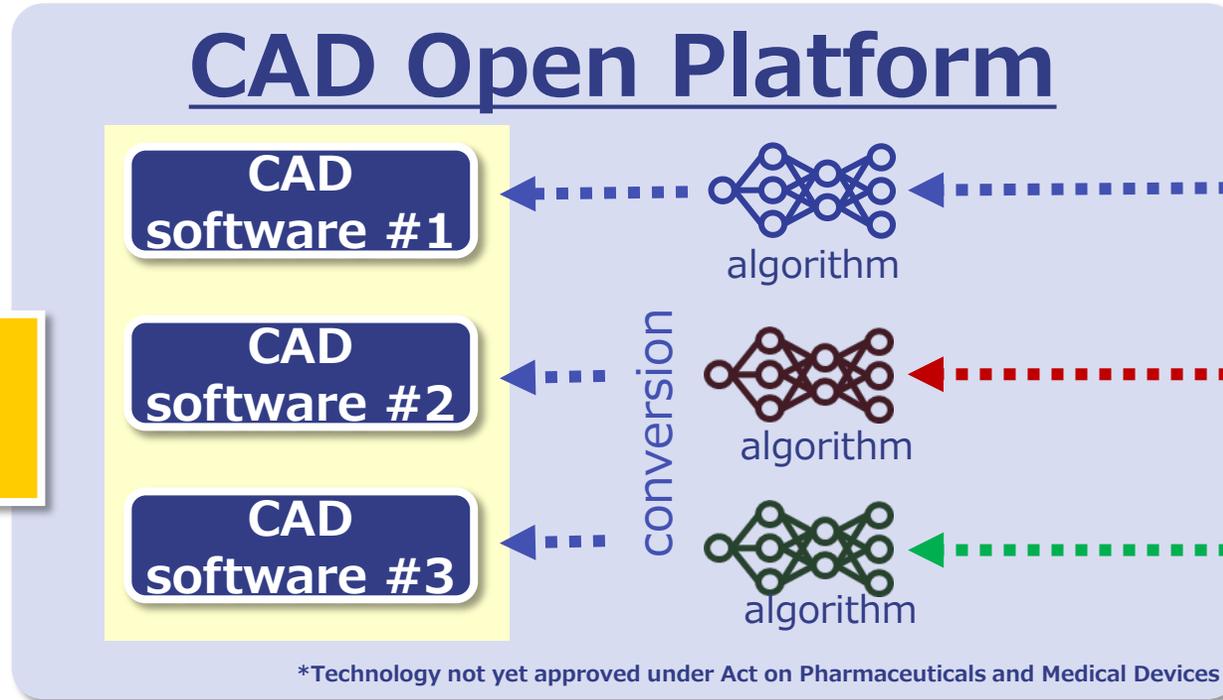
## CAD Open Platform

Incorporate CAD software from various companies

→ CAD algorithms developed by our partners are converted to software that runs on our platform

\*Technology not yet approved under Act on Pharmaceuticals and Medical Devices





This technology will offer a range of CAD software available on our platform by converting CAD algorithms developed by partner companies to CAD software for use on our platform

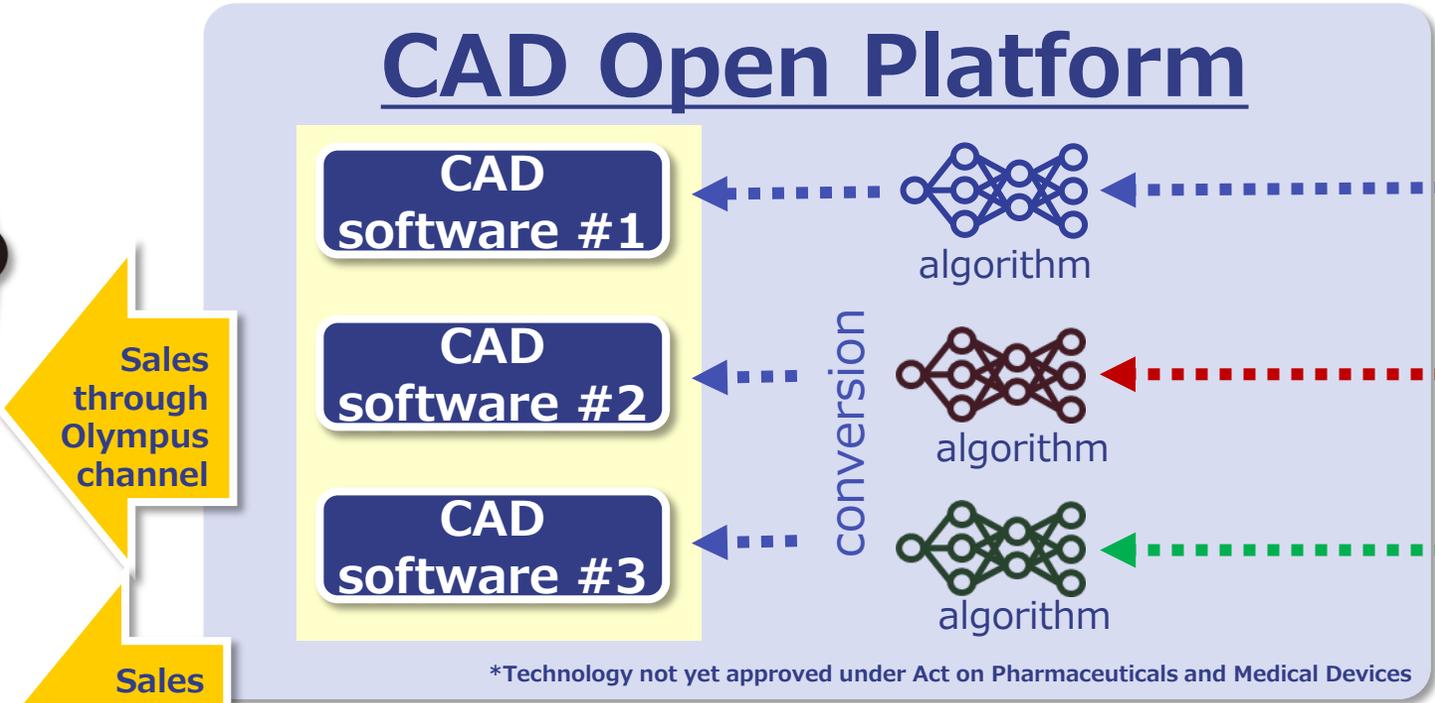
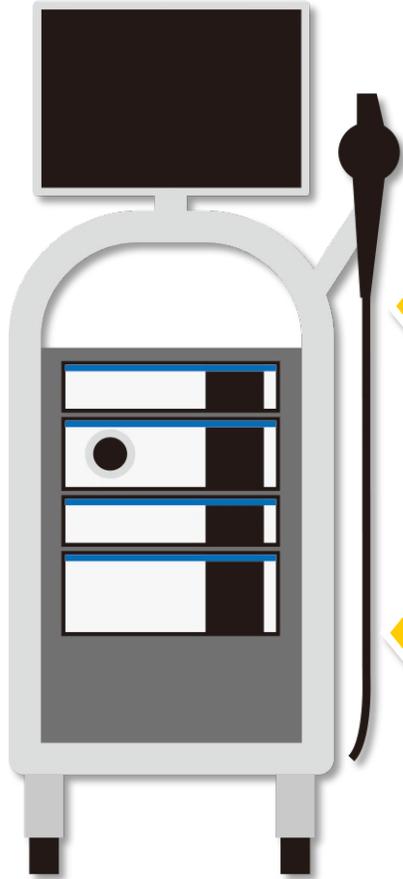
Olympus CAD Device

CAD device of Company A

CAD device of Company B

CAD device of Company C

CAD device of Company D



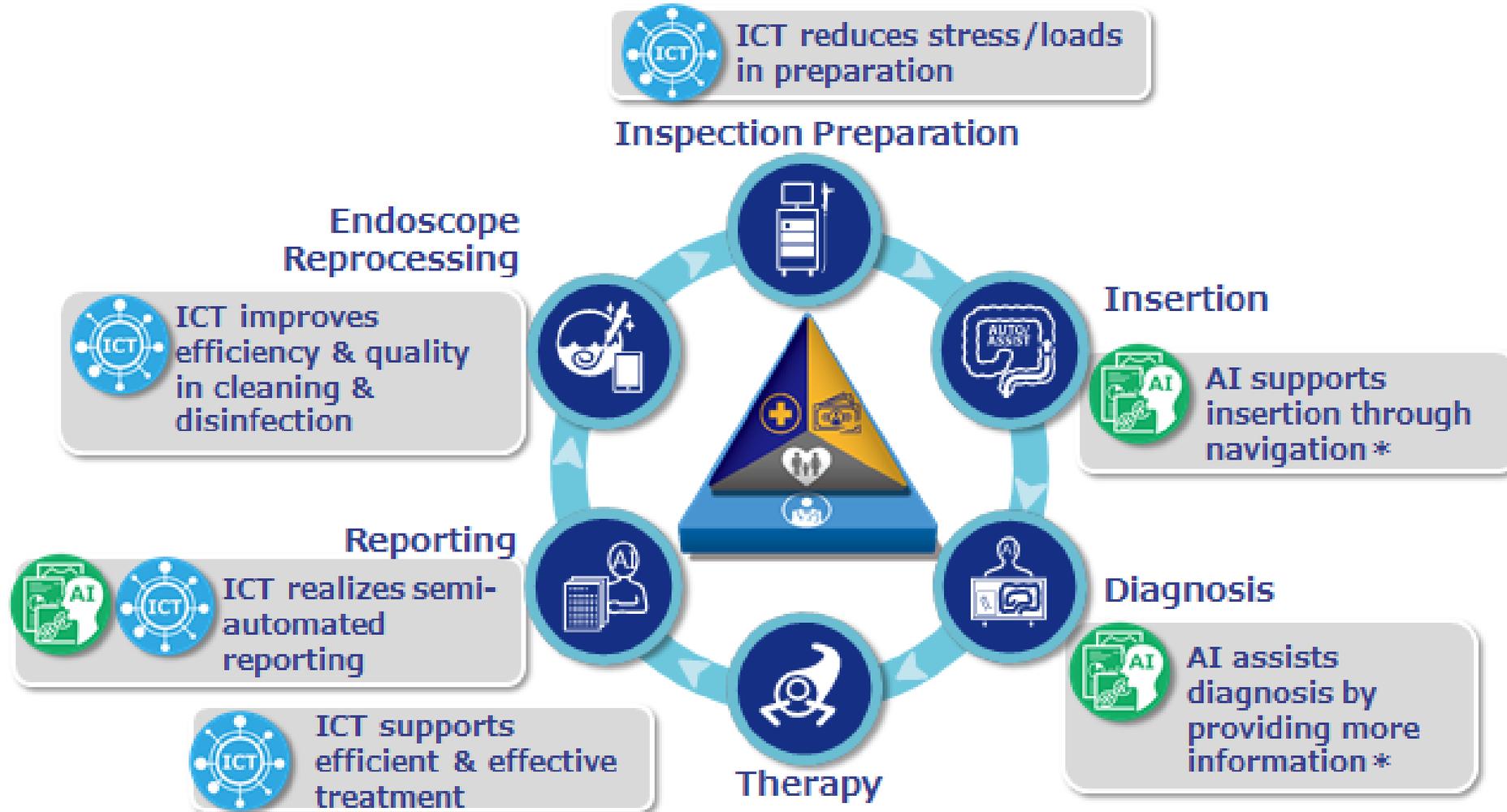
Sales through Olympus channel

Sales through Olympus channel

CAD devices, developed by partner companies, may also be provided through our sales channel, independently from the CAD Open Platform, depending on circumstances."

-  Olympus CAD Device
-  CAD device of Company A
-  CAD device of Company B
-  CAD device of Company C
-  CAD device of Company D

We will continue striving to develop technologies by utilizing AI and ICT to further advance and spread the Endoscopic Medicine



\*Technology not yet approved under the Act on Pharmaceuticals and Medical Devices

**OLYMPUS**

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